HSTSS Quarterly

July 1999

Newsletter of the *HARDENED SUBMINIATURE TELEMETRY and SENSOR SYSTEM*

The HSTSS Program

HSTSS is a program to develop subminiature G-hardened on-board instrumentation for small missiles, indirect fire projectiles and munitions, medium caliber and direct fire projectiles. **HSTSS** technologies and products are designed at die and chip-level for growth and expansion to support new applications and new requirements.

Annual HSTSS Symposium To Be Held September '99, Dallas, TX

HSTSS will host its annual symposium in Dallas, TX on **14, 15, and 16 September 1999** (Tues, Weds, Thurs) at the Sheraton Grand Hotel (DFW).

Tuesday's meeting will be dedicated to GPS topics. There will also be an informal reception Tuesday evening. Scheduled for Wednesday is the **HSTSS** Program Review. On Thursday there will be a Requirements and Applications Meeting for all to share applications needs, as well as experiences.

Contractors are invited to present technical information on a first-come, first-served basis. Please contact Ronald Colangelo (407-384-5236) to coordinate.

HSTSS Tri-Service Programs

Multiple Launch Rocket System (MLRS) - Final designs are being completed and prototypes due 4QTR99.

Extended Range Guided Munition (ERGM) - In mid July discussions were initiated with the US Navy's ERGM project office on how **HSTSS** can fulfill their testing requirements. Tactical and training applications were discussed.

Advanced Kinetic Energy (KE) Rod - **HSTSS** instrumentation was successfully employed by ARL at Yuma Proving Ground in early July in support of advanced KE Rod testing.

Project Director's Notes

I congratulate all the IPT members whose efforts are recognized by BG Bond, Commander STRICOM, and rewarded with his STRICOM Team Achievement Recognition (STAR) Award. It was another great team effort!

Our periodic newsletter is a way for us to build yet a stronger team. Please call me or e-mail any information you would like published in its pages. I know some of you are working other projects, and it would be advantageous for us to share information and leverage each other's efforts. This is a team publication created with team input.

My phone number is **407-384-5236**, or **DSN 970-5236** and my e-mail address is ronald_colangelo@stricom.army.mil. Please give me a call and let me know how we are doing or what we can do better.

Calendar of Upcoming Events

HSTSS Symposium
14, 15, 16 September 1999 - Dallas, Texas
Sheraton Grand Hotel (DFW)
(Invitation and Registration Attached)

International Telemetry Conference (ITC)
25-28 October 1999 - Las Vegas, Nevada
HSTSS session:
Afternoon of Oct. 27 and Morning of Oct. 28

HSTSS/ARL Lab Open House

-Aberdeen Proving Grounds – The Army Research Lab (ARL) held an open house to showcase their new HSTSS laboratories. STRICOM PM-ITTS IMO director Russ Longenbach took the opportunity to present the STAR award to the HSTSS IPT members that were present.

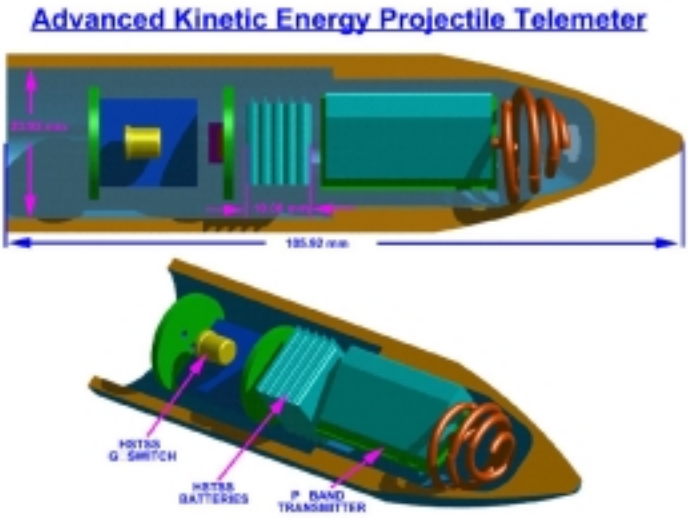
After the ceremonies, attendees were given tours of the new state-of-the-art facilities. These facilities included environmental test facilities, rapid prototyping stations, integration lab, telemetry lab, and a well-equiped class 10,000/1000 clean room. Informative demonstrations were conducted for the benefit of the attendees.

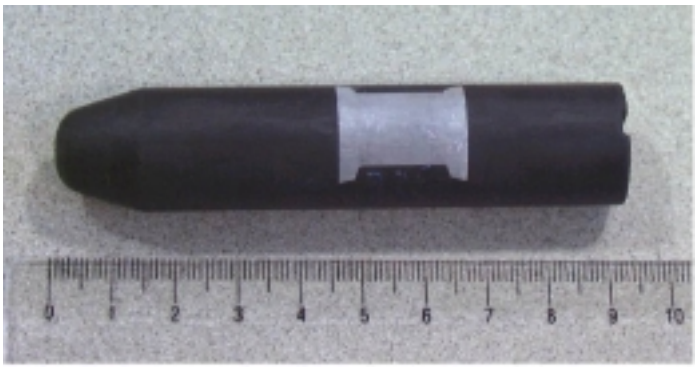
HSTSS Successfully Instruments an Advanced Kinetic Energy (KE) Projectile for Alliant TechSystems

Utilizing **HSTSS** products, engineers at the **U. S. Army Research Laboratory** at Aberdeen Proving Ground have designed a telemetry system for an advanced KE projectile. This system was designed for and sponsored by Alliant TechSystems' advanced KE projectile program. This single channel telemetry system fits in the nose of the projectile and provides on-board diagnostics information. In order to meet both space and system requirements an HSTSS developed acceleration switch and battery were required. The latching acceleration switch, manufactured by the Aerodyne Corporation, was used to turn the system on at launch. An Ultralife Batteries Inc. lithium manganese dioxide battery made of custom pouch cells was used for the power source.

Two units were flight tested at Yuma Proving Ground on July 2, 1999 with 100% success. The setback acceleration was estimated to be 48,000g. The encapsulated telemetry module is shown at right.

Future HSTSS products, such as the transmitter and DAC will allow for a multi-channel system utilizing less than a quarter of the space shown.





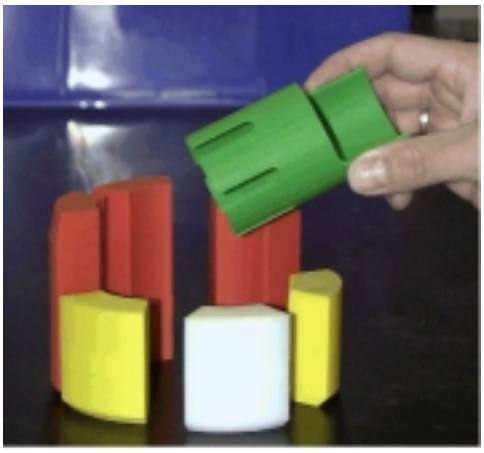
Encapsulated Telemetry Module

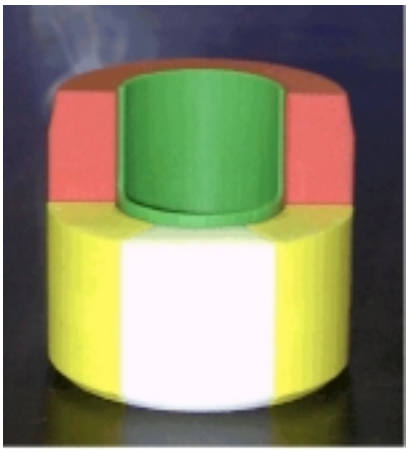
HSTSS/MLRS Update

Mike Hollis of ARL and HSTSS/MLRS IPT members are completing the final design of he MLRS telemeter set. The telemetry system was designed to be installed into live tactical rounds in the field. The system will be installed within the rocket's ogive directly behind the fuse. The system will measure fuse and health functions during flight.

Adding to the difficulties of working on tactical rounds is the fact that entire system must be installed and assembled through a 2.6 inch diameter fuse hole while the rocket is in the pod. The **HSTSS/MLRS IPT** cleverly designed the system so that one technician, using only hand tools can perform the installation of the system.

The **HSTSS** electronics consist of two lithium-manganese-dioxide batteries, an encoder, transmitter, turn-on board, and an antenna. All of the electronics, with the exception of the antenna, are encapsulated into wedges that can be inserted one-at-a-time through the fuse opening. A sleeve is then slid down into the middle of the wedges to lock the wedges together. The wedges are then interconnected with a series of short wire harnesses. A patch antenna will be installed on a small door on the side of the ogive. The fuze will then be re-installed and locked into place. The entire assembly takes place in the field, with one person, working through the rocket pod door of the MLRS.





HSTSS Presentation Agenda for ITC

Topic	Presenter	Topic	Presenter
Introduction	Ron Colangelo, PD, *PM ITTS*	**Crystal Oscillator**	Al Hart, *YPG*
Logistics	Martin Phillips, *STRICOM*	**Sensors**	Brad Davis, *ARL*
Modular Approach	Dennis Schneider/Robert Carpenter, *STRICOM/AST*	**Programmable Substrates**	*MCC*
Leveraging Government and Commercial Applications	William D'Amico, *ARL*	**Transmitter**	Larry Burke, *ARL*
PCM & ISC	Leif Fredin/David Gibson/Gary Borgen, *SPEC/NAWCWPNS*	**Batteries**	Larry Burke, *ARL*
DR & FDM	Gary McMillian/Michael Doerr/Larry Burke, *SPEC/ARL*	**Conclusion**	Ron Colangelo, *PM ITTS*
19 Channel PCA	Bernie Penrose/David Gibson/Ralph Wade, *SPEC/Eglin AFB*		

HSTSS SYMPOSIUM INVITATION

HSTSS is hosting its annual ***HSTSS*** **Symposium** in **Dallas, Texas** at the **Sheraton Grand Hotel, DFW** on **14-16 September 1999**. All interested Government and Industry personnel are invited to attend. If you plan on attending, **please complete the attached no-cost registration form below**.

Location:

Dallas, Texas - Sheraton Grand Hotel, DFW
Phone: (800) 345-5251 or (972) 929-8400

Dates:

14, 15, and16 September 1999

Costs:

There is no registration fee.

Hotel/Lodging:

- Attendees must arrange their own transportation, lodging, and meals.
- A block of rooms will be reserved at the Sheraton Grand at per-diem rates for government employees ($89.00/night).
- Corporate rates will be available at the Sheraton Grand for non-government attendees ($135.00/night).
- When registering, tell the hotel you are attending the **HSTSS Symposium**.
- The hotel offers complimentary transportation to/from the DFW airport.

REGISTRATION

In order to help us in our planning, please provide the following information to Ed Chester (Ed_Chester@stricom.army.mil) by 1 September 1999.

NAME:
TITLE:
ORGANIZATION:
PHONE:
E-MAIL:
DAY(S) YOU PLAN ON ATTENDING:

If you have any questions, please call **Ed Chester at (407) 384-5492**.

AGENDA

(Preliminary)

HARDENED SUBMINIATURE TELEMETRY AND SENSOR SYSTEM (HSTSS) SYMPOSIUM

DALLAS, TX

SEPTEMBER 14-16, 1999

Tuesday, September 14 – GPS Requirements & Applications

0830 Opening Statements
0845 Introductions
0900 GPS Applications: Artillery, Missiles, TSPI, Safety, Training
1130 Lunch Break
1300 GPS Requirements: Open Forum
1600 Adjourn
1800 Informal Reception

Wednesday, September 15 – HSTSS Program Review

0830 Opening Statements
0845 Power Source
0925 Transmitter
0955 Crystal Oscillator
1010 FPGA PCM Encoder Data Acquisition Chip (DAC)
1030 ASIC DACs: PCM, FDM, Delay, and ISC Modules
1130 Lunch Break
1300 Multi-Chip Module (MCM) Packaging
1330 Pressure Sensor
1410 G-Switch
1430 Inertial Measurement Unit (IMU)
1510 GPS
1540 MEMS
1600 Summary and Discussion
1700 Adjourn

Thursday, September 16 – HSTSS Requirements & Applications

0800 Opening Statements
0815 Open Discussion: Applications and User Requirements Review
1130 Lunch Break
1300 Government-Only Discussions
1600 Adjourn